

**WHAT IS CLAIMED:**

1. A method for amplifying nucleic acid, comprising:
  - introducing a nucleic acid molecule into a cell, wherein the nucleic acid molecule include a sequence of nucleotides that target it to an amplifiable region of a chromosome in the cell;
  - growing the cell; and
  - identifying from among the resulting cells those that include a chromosome with a portion that has undergone amplification.
2. The method of claim 1, wherein the targeting sequence of nucleotide is selected from among those that target the molecule to the pericentric heterochromatic region of a chromosome.
3. The method of claim 1, wherein the targeting sequence comprises rDNA.
4. The method of claim 1, wherein the targeting sequence comprises an origin of replication or an amplification promoting sequence (APS).
5. The method of claim 1, wherein the cell is an animal cell.
6. The method of claim 1, wherein the cell is a plant cell.
7. A method for amplifying nucleic acid, comprising:
  - introducing a DNA fragment into a cell, wherein the DNA fragment comprises a selectable marker;
  - growing the cell under selective conditions to produce cells that have incorporated the DNA fragment or a portion thereof that comprises the selectable marker into a chromosome; and
- 20 25 identifying from among the resulting cells those that include a chromosome or fragment thereof with a portion that has undergone amplification.
8. The method of claim 7, wherein the DNA fragment comprises rDNA.
- 30 9. The method of claims 7, wherein the cell is an animal cell.
10. The method of claims 7, wherein the cell is a plant cell.

11. A method for amplifying a nucleic acid, comprising:  
introducing nucleic acid fragment comprising sequences of  
nucleotides targeted to an amplifiable region of a chromosome into a cell  
under conditions whereby the fragment integrates into the chromosome.
- 5 12. The method of claim 11, further comprising replicating the  
cell.
13. The method of claim 11, wherein the targeting sequences of  
nucleotides are selected from among those that target the molecule to the  
pericentric heterochromatic region of a chromosome.
- 10 14. The method of claim 11, wherein the targeting sequences  
comprise rDNA.
15. The method of claim 11, wherein the targeting sequences  
comprise an origin of replication or an amplification promoting sequence  
(APS).
16. The method of claim 11, wherein the cell is an animal cell.
17. The method of claim 16, wherein the animal is a mammal.
18. The method of claim 11, wherein the cell is a plant cell.
19. The method of claim 18, wherein the plant is tobacco, rice,  
maize, rye, soybean, Brassica napus, cotton, lettuce, potato, tomato or
- 20 arabidopsis.
20. A nucleic acid molecule, comprising:  
nucleic acid encoding a gene product or gene products;  
a selectable marker; and  
sequences of nucleotides targeted to an amplifiable region of  
25 a chromosome in a cell.
21. The nucleic acid molecule of claim 20, wherein the targeting  
sequences of nucleotides are selected from among those that target the  
molecule to the pericentric heterochromatic region of a chromosome.
22. The nucleic acid molecule of claim 20, wherein the targeting  
30 sequences comprise rDNA.

23. The nucleic acid molecule of claim 20, wherein the targeting sequences comprise an origin of replication or an amplification promoting sequence (APS).
24. The nucleic acid molecule of claim 20, wherein the gene products encode a biosynthetic pathway.
25. The nucleic acid molecule of claim 20 that is a plasmid.
26. The nucleic acid molecule of claim 20, wherein the cell is an animal cell.
27. The nucleic acid molecule of claim 20, wherein the cell is a plant cell.
28. The nucleic acid molecule of claim 26, wherein the animal is a mammal.
29. The nucleic acid molecule of claim 27, wherein the plant is tobacco, rice, maize, rye, soybean, Brassica napus, cotton, lettuce, potato, tomato or arabidopsis.
30. A method for amplifying a nucleic acid, comprising:  
introducing nucleic acid fragment that comprises rDNA into a cell under conditions that produce cells that have incorporated the DNA fragment or a portion thereof that comprises the rDNA into a chromosome of the cell.
31. The method of claim 30, wherein the cell is an animal cell.
32. The method of claim 30, wherein the cell is a plant cell.
33. A method for amplifying a nucleic acid, comprising:  
introducing nucleic acid fragment that comprises an origin of replication or an amplification promoting sequence into a cell under conditions to produce cells that have incorporated the DNA fragment or a portion thereof that comprises the origin of replication or an amplification promoting sequence into a chromosome of the cell.
34. The method of claim 33, wherein the cell is an animal cell.
35. The method of claim 33, wherein the cell is a plant cell.